

title.

#1- (b)  $\frac{1}{2}, 2, 1$ 

date.

No. 1

$$\#1-(b), \quad y = \frac{1}{x^2} = f(x)$$

$$\hookrightarrow \frac{dy}{dx} \Big|_{x=2} - f'(2)$$

$$= \lim_{\Delta x \rightarrow 0} \frac{f(2+\Delta x) - f(2)}{\Delta x}$$

$$= \lim_{\Delta x \rightarrow 0} \frac{(2+\Delta x)^2 - \frac{1}{2^2}}{\Delta x}$$

$$= \lim_{\Delta x \rightarrow 0} \frac{4 - (2+\Delta x)^2}{\Delta x (2+\Delta x)^2}$$

$$= \lim_{\Delta x \rightarrow 0} \frac{-(4+\Delta x)\Delta x}{\Delta x (2+\Delta x)^2}$$

$$= \frac{-4}{4 \times 2^2} = -\frac{1}{4} \quad *$$

$$\#1-(d) \quad y = \sqrt{x^2+1} = g(x)$$

$$\hookrightarrow \frac{dy}{dx} \Big|_{x=2} = g'(2)$$

$$= \lim_{\Delta x \rightarrow 0} \frac{g(2+\Delta x) - g(2)}{\Delta x}$$

$$= \lim_{\Delta x \rightarrow 0} \frac{\sqrt{(2+\Delta x)^2+1} - \sqrt{2^2+1}}{\Delta x}$$

$$= \lim_{\Delta x \rightarrow 0} \frac{(\Delta x) \cancel{(\sqrt{(2+\Delta x)^2+1} + \sqrt{2^2+1})}}{\Delta x (\sqrt{(2+\Delta x)^2+1} + \sqrt{2^2+1})}$$

$$= \frac{1}{2\sqrt{5}} = \frac{2}{\sqrt{5}} \quad *$$